California Marine Affairs and Navigation Conference

February 5, 2002
Santa Barbara, CA

Air Resources Board

California Environmental Protection Agency

Overview

- **Perspective on Maritime Emissions**
- **Existing Air Quality Programs**
- **Framework for Further Improvement**
- **Participation in Regulatory Process**
- **Conclusion**

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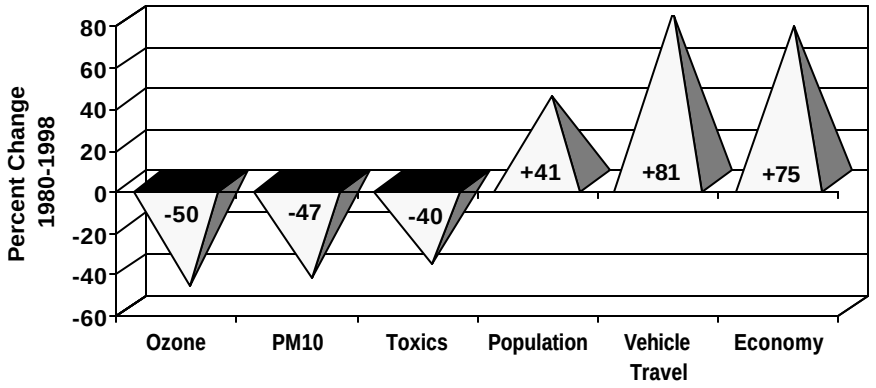
Perspective on Maritime Emissions

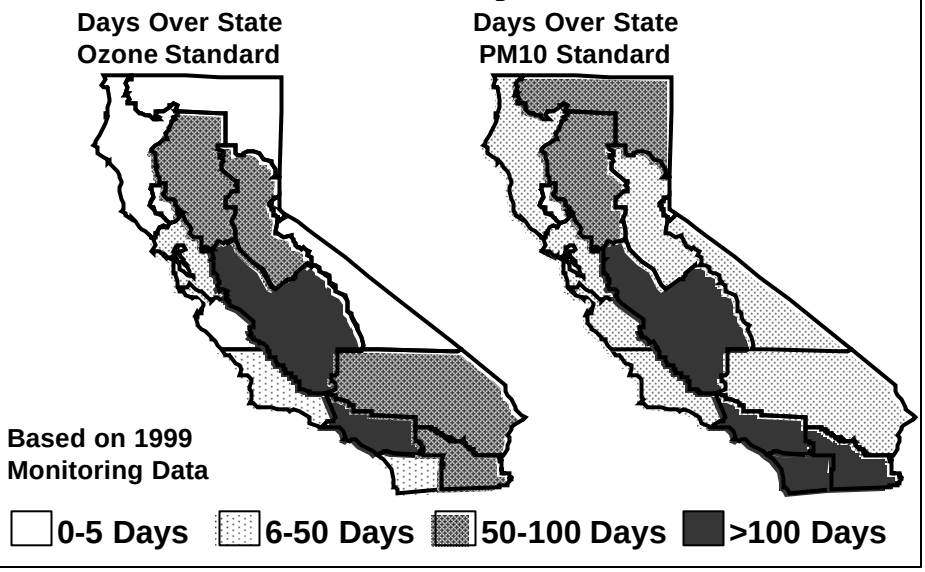
Air Quality Is Improving



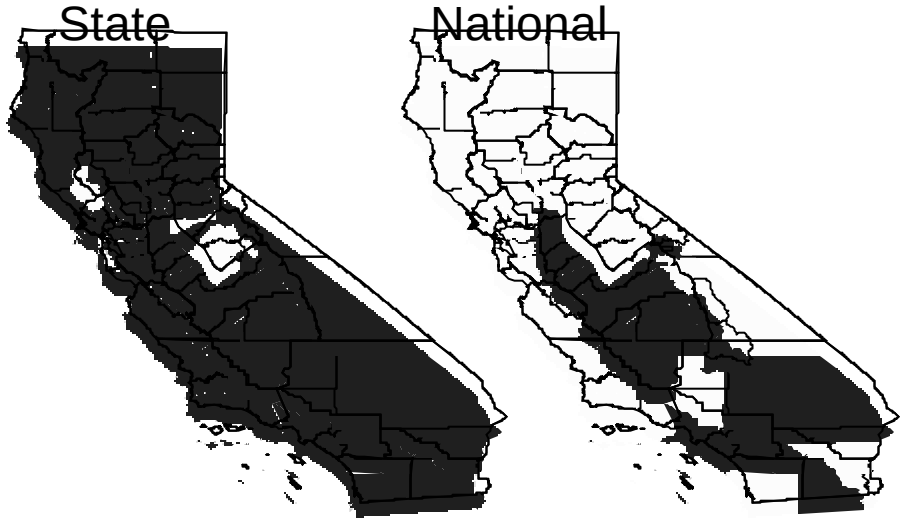
Despite Progress Much Left to Do

- **Over 90% of Californians exposed to unhealthy air**
- **Additional emission reductions needed to attain air quality standards**
- **Risk from air toxics is too high**

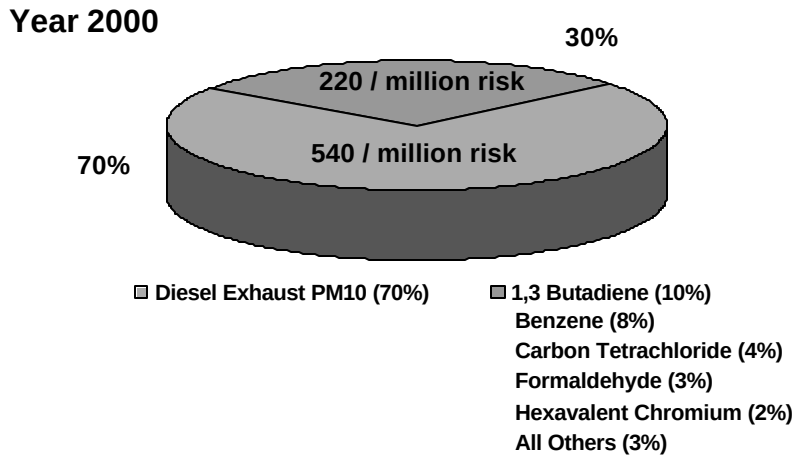
Over 90% of Californians Breathe Unhealthy Air at Times



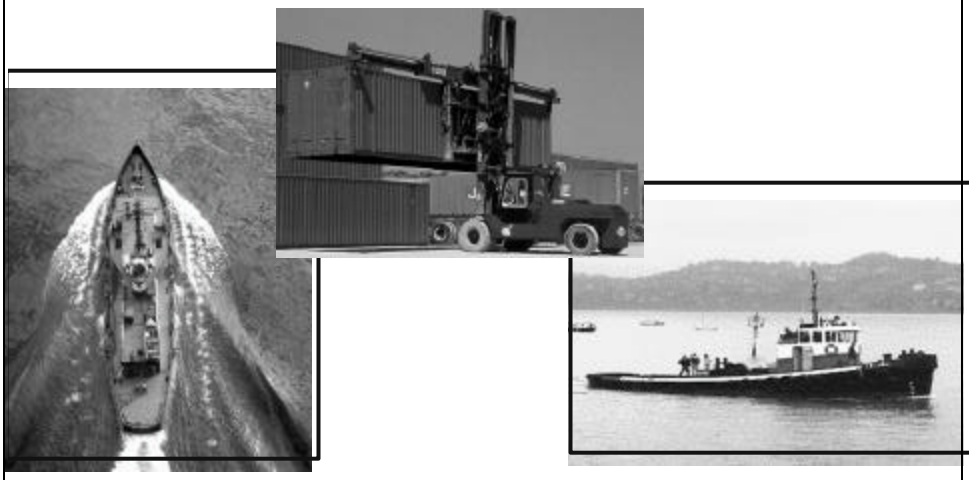
Nonattainment Areas for PM_{10} Standards



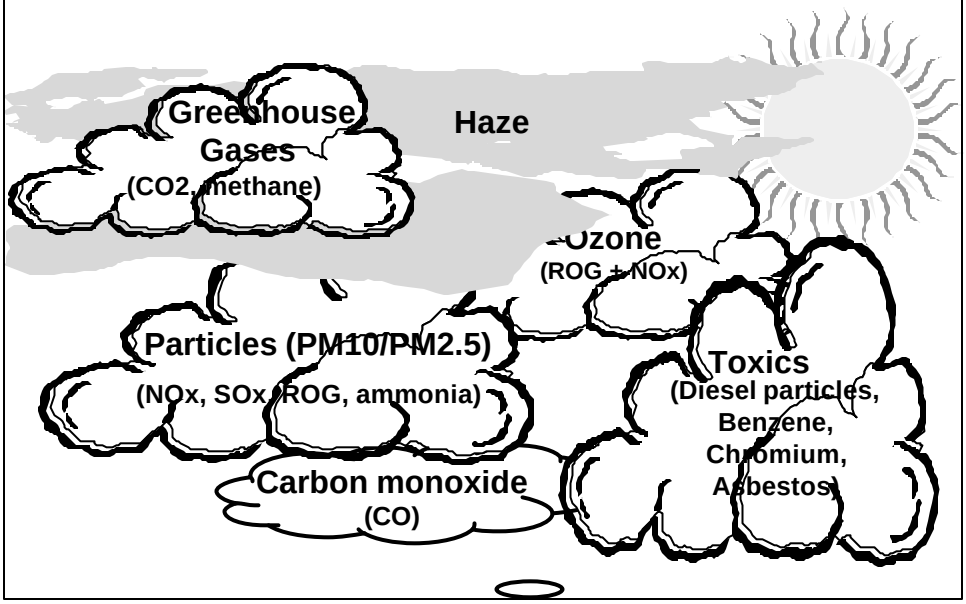
Statewide Air Toxics Risk for Year 2000



How do Maritime Emissions Fit into California's Air Quality Picture?



What Pollutants Are of Concern?



Emission Sources at Ports: Cargo Handling Equipment

- **Yard trucks, RTG cranes, side picks and top picks, forklifts, etc.**

Emission Sources at Ports: Land-based Cargo Transportation

- Heavy-duty diesel trucks
- Locomotives

Emission Sources at Ports: Miscellaneous

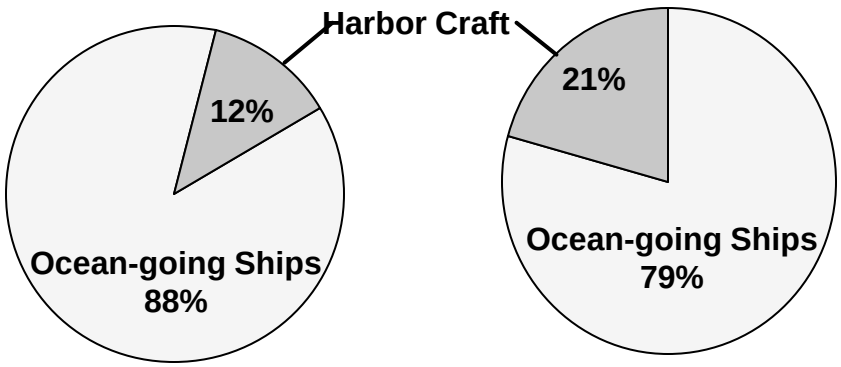
- Diesel transport refrigeration units and electricity generators
- Storage/Processing/Packaging of raw materials (fuel handling and storage, dust from raw materials)
- Light-duty vehicles

Emission Sources at Ports: Marine Vessels

- **Ocean-going vessels (container ships, tankers, cruise ships, etc.)**
- **Harbor craft (ferries, tugboats, commercial fishing, Coast Guard, etc.)**

Ocean-going Ships and Harbor Craft

Year 2000 Statewide Diesel PM and NOx Emissions



Diesel PM

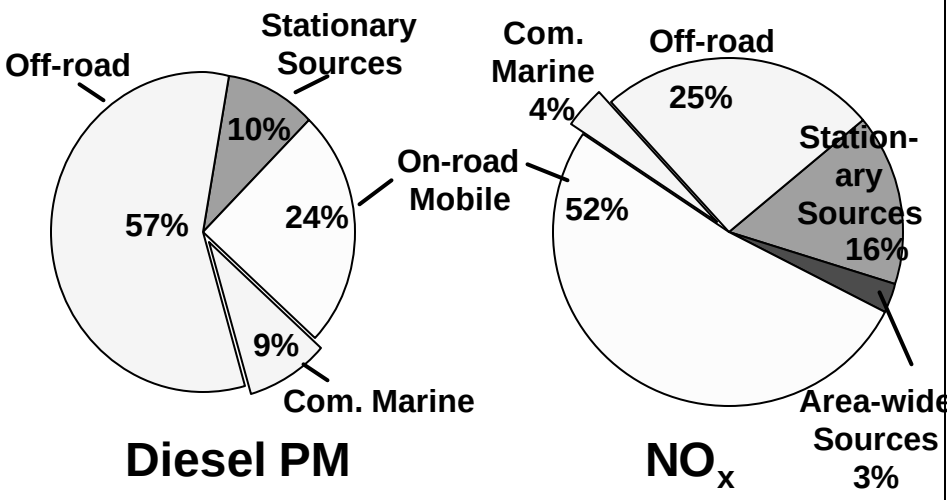
9 TPD Total

NO_x

101 TPD Total

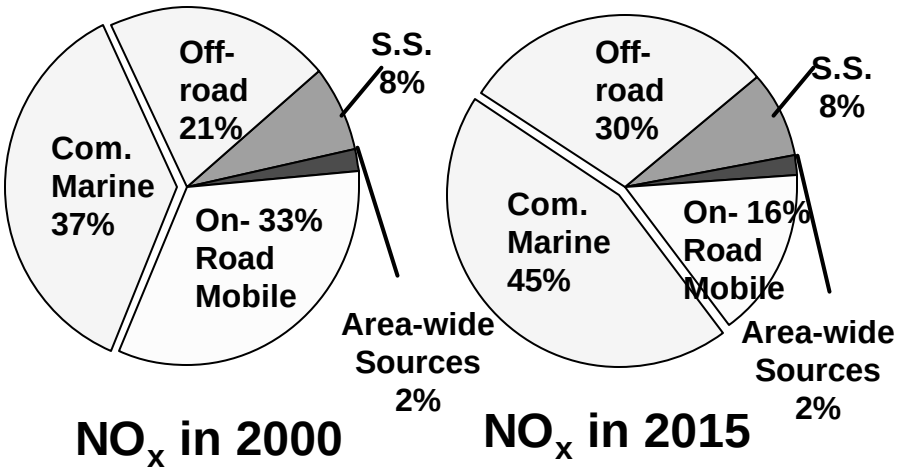
Commercial Marine Vessels are Important Contributors to Diesel PM and NOx Emissions

Year 2000 Statewide Diesel PM and NOx Emissions



Commercial Marine Vessel Contribution to Santa Barbara's NOx Emissions

Year 2000 SBCAPCD's Diesel PM and NOx Emissions



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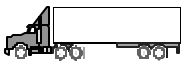
Existing Air Quality Programs

Focus on Diesel-Fueled Engines

- On-Road Trucks
- Off-Road Mobile Sources
- Locomotives
- Commercial Marine vessels

Existing Emission Reduction Strategies for On-Road Heavy-Duty Diesel Engines



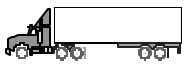
New Engines

- **Stringent new engine emission limits**
  - Harmonize with U.S. EPA
  - Current: 4 g/bhp-hr NOx; 0.1 g/bhp-hr PM
  - 2004: 2.4 g/bhp-hr NOx + NMHC; 0.1 g/bhp-hr PM
  - 2007: 0.7 g/bhp-hr NOx; 0.01 g/bhp-hr PM

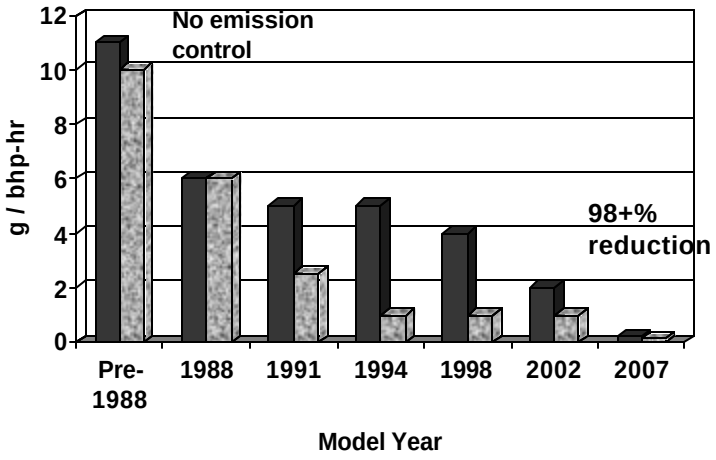
In-Use Engines

- **Heavy-duty vehicle inspection and periodic smoke inspection programs**
- **Clean fuels**
- **Carl Moyer Memorial Air Quality Standards Attainment Program**

Reducing Diesel Emissions



New Truck Standards



Existing Emission Reduction Strategies for Off-Road Diesel Engines

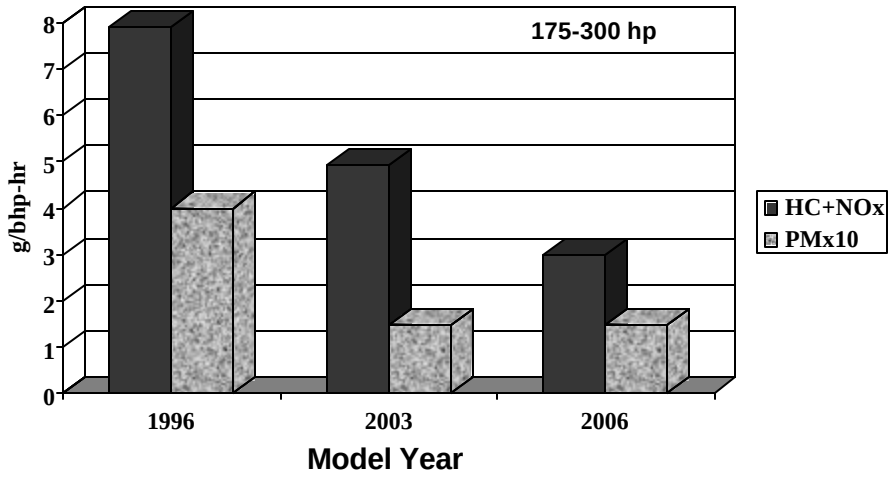
New Engines

- **New engine emission limits**
  - Tier I 1996 and later
  - Tier II 2001 and later
  - Tier III 2006 and later

In-Use Engines

- **Carl Moyer Memorial Air Quality Standards Attainment Program**

Reducing Diesel Emissions New Off-road Engines



Existing Emission Reduction Strategies for Locomotives

New Engines

- **New and remanufactured engine emission limits**
  - Tier 0 1973-2001
  - Tier I 2002 - 2004
  - Tier II 2005 and later

In-Use Engines

- **MOU for Locomotives in the South Coast Air Basin**
- **Carl Moyer Memorial Air Quality Standards Attainment Program**
- **Emission Reduction Research Program**

Existing Emission Reduction Strategies for Commercial Marine Vessels

New Engines

- **New engine emission limits**
  - International Maritime Organization 2000 NOx Limits
  - U.S. EPA Limits starting 2004-2007

In-Use Engines

- **Carl Moyer Memorial Air Quality Standards Attainment Program**
- **Vessel Speed MOU at Ports of Los Angeles and Long Beach**
- **Local District Programs**

International Maritime Organization

- Applies to new diesel engines over 130 kW (174 hp)
- NOx standards range from 9.8 to 17 g/kW-hr, depending on engine speed
- Not yet enforceable, but engine manufacturers complying
- Modest emission reductions in CA

U.S. EPA Harbor Craft Standards

- Applies to new diesel engines over 37 kW (50 hp)
- Excludes “Category 3” engines used in oceangoing vessels
- Standards effective 2004-2007, and apply to NOx+HC, PM, & CO
- Modest reductions prior to 2010

Voluntary Speed Reduction MOU

- Applies to ocean-going ships
- Ships requested to voluntarily reduce speed to 12 knots within 20 miles of the Ports of Los Angeles/Long Beach
- MOU will reduce NOx emissions by 2-4 TPD in the SCAB with full compliance

Other Programs

- Carl Moyer Funding
- South Coast AQMD Credit Generation Rules (Rules 1631 &1632)
- ARB NOx and PM Emission Reduction Program

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Framework for Further Improvement

Strategies for a Healthy Future: ARB's Clean Air Plan

- **Plan for reducing criteria and toxic pollutants from every source**

Timeframes for Plan Strategies

- **Near-term (until 2005)**
  - **Improve community health**
  - **Meet federal ozone & PM10 standards**
- **Mid-term (2005 - 2010)**
  - **Reduce diesel particulates by 75%**
  - **Meet federal ozone std. in South Coast**
- **Long-term (post-2010)**
  - **Attain State standards**
  - **Address emissions growth**

Schedule for Clean Air Plan

May 2001:	**Hold emission reduction concepts workshop**
February 2002:	**Release draft Plan**
Spring 2002:	**Hold workshops on draft Plan**
Late Spring:	**Present Plan to Board for consideration and approval**

Proposed Clean Air Plan Measures for Marine Vessels and Ports

- **Shared regulatory responsibility**
- **Measures implemented statewide**
- **Measures subject to public comment and commercial and technological feasibility analysis**

Proposing Six Measures

- **Proposed Measures:**
  - **More Stringent National/Intl New Engine Stds**
  - **In-Use Emissions from Harbor Craft**
  - **In-Use Emissions from Oceangoing Ships**
  - **Advanced Technology & Innovative Strategies**
  - **Port-Specific Strategies for Land-based Sources**
- **Evaluating Different Control Options under each Measure**

Proposed Marine 1 - More Stringent National & Int'l New Engine Standards

- Revise IMO Standards
- Revise U.S. EPA "Tier II" National Harbor Craft Standards
- Adopt U.S. EPA Standards for Oceangoing Ships
- Mid-term Measure, 2005-2010
- U.S. EPA lead agency

Proposed Marine 2 - Reduce In-Use Emissions from Harbor Craft

- Add-on Control Equipment
- Use of Cleaner Fuels
- Combinations of both
- Near-Term, 2005
- ARB lead agency

Proposed Marine 3 - Reduce In-Use Emissions from Oceangoing Ships

- Require Use of Cleaner Fuels
- Opacity Limits
- Incentive Programs
- Mid-term, 2005-2010
- Collaboration with US EPA and districts

Proposed Marine 4 - Advanced Technologies & Innovative Strategies

- Both Harbor Craft and Oceangoing
- Fuel Cells/Solar Power
- Cold Ironing
- Operational Controls
- Long-term, post 2010
- State, Local, and National Collaboration

Proposed Port 1 - Port Specific Strategies for Land-Based Sources

- **Create Port Specific Emission Inventories**
- **Assess impacts of CAP and determine if additional emission reductions needed**
- **Identify and implement any necessary port-specific measures**

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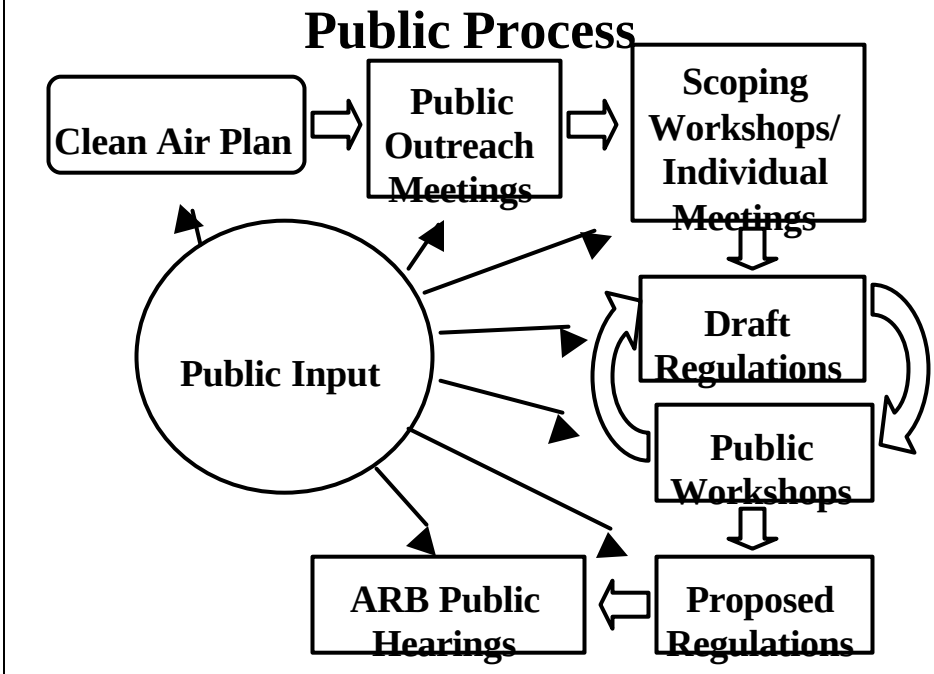
Participation in Regulatory Process

Maritime Air Quality Technical Working Group

- Forum for on-going communication, cooperation, and coordination
- Focus on maritime air quality impacts
- Open to all interested parties
- Meet semi-annually
- Smaller, more frequent, and focused meetings as necessary



ARB Contacts

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◦ Mobile:	Nancy Steele	(626) 350-6598
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◦ Portable:	Todd Wong	(916) 324-8031
◦ Truck Refrigeration Units:	Tony Andreoni	(916) 324-6021
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• In-Use Compliance Testing & Recall	Stevan Lemieux	(626) 575-6695
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• Clean Air Plan:	Kim Heroy-Rogalski	(916) 327-2200
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ARB Website: www.arb.ca.gov

Marine Vessel Programs:
www.arb.ca.gov/msprog/offroad/marinevess/marinevess.htm